AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method of using a secondary key to facilitate invalidation of cached data, comprising:

at a first data source:

associating a URL (Uniform Resource Locator) with a first data object;

forwarding the first data object to a cache, along with:

a primary key comprising the URL; and

a secondary key configured to identify the first data source;

caching the first data object at the cache, wherein the cache is configured to cache multiple versions of the first data object, and wherein each version is cached with a different primary key and the same secondary key;

issuing an invalidation message from the first data source to the cache, wherein said invalidation message comprises the identifier; and

at the cache, using the identifier to identify one or more data objects for invalidation, including the first data object.

2. (Original) The method of claim 1, wherein:

the primary key uniquely identifies the first data object; and

the secondary key identifies a set of data objects having the same data source.

3. (Original) The method of claim 1, further comprising, at the cache:

maintaining a mapping of said secondary key to URLs of the one or more data objects.

4. (Original) The method of claim 1, further comprising, at the cache:

maintaining a mapping of the URL of the first data object to one or more secondary keys of the first data object, including said secondary key.

5. (Original) The method of claim 1, wherein the invalidation message is issued after the source of the one or more data objects changes from the first data source to a second data source.

6. (Currently amended) A computer readable medium storing instructions that, when executed by a computer, cause the computer to perform a method of using a secondary key to facilitate invalidation of cached data, wherein the computer-readable medium includes one of a volatile memory, a non-volatile memory, a disk drive, a magnetic tape, a compact disc, a digital versatile disk, and a digital video disk, the method comprising:

at a first data source:

associating a URL (Uniform Resource Locator) with a first data object;

forwarding the first data object to a cache, along with:

a primary key comprising the URL; and

a secondary key configured to identify the first data source;

caching the first data object at the cache, wherein the cache is configured to cache multiple versions of the first data object, and wherein each version is cached with a different primary key and the same secondary key;

issuing an invalidation message from the first data source to the cache,

wherein said invalidation message comprises the identifier; and

at the cache, using the identifier to identify one or more data objects for invalidation, including the first data object.

7. (Currently amended) A computer-implemented method of facilitating invalidation of cached data using a secondary key, the method comprising:

at an application configured to produce cacheable data objects, associating with a first data object:

a first primary key configured to uniquely identify the first data object within a collection of computer systems; and

a first secondary key configured to identify multiple data objects having a common attribute;

when the first data object is provided to a cache to be cached, providing said first secondary key, wherein the cache is configured to cache multiple versions of the first data object, and wherein each version is cached with a second primary key and the first secondary key; and

issuing an invalidation message from the application to the cache to invalidate the multiple data objects, wherein the invalidation message includes said first secondary key.

8. (Original) The method of claim 7, wherein the first primary key is identified to the cache by a client when the client desires to receive the first data object.

9. (Original) The method of claim 8, wherein the first secondary key is not known to the client.

10. (Original) The method of claim 7, wherein said first secondary key

comprises an identifier of the application.

11. (Original) The method of claim 7, wherein:

the common attribute is a data source; and

said first secondary key comprises an identifier of a source of the first data object.

12. (Original) The method of claim 7, wherein:

the common attribute is a template used to produce the multiple data objects; and

said first secondary key comprises an identifier of the template.

13. (Original) The method of claim 7, further comprising, at the cache:

receiving the invalidation message;

mapping said first secondary key to primary keys of the multiple data objects; and

invalidating the multiple data objects.

14. (Original) The method of claim 7, wherein said first secondary key comprises a security symbol.

15. (Original) The method of claim 7, wherein said first secondary key comprises a name.

16. (Original) The method of claim 7, wherein said first secondary key comprises a date.

17. (Original) The method of claim 7, wherein said first secondary key

comprises address information.

18. (Original) The method of claim 7, wherein said first secondary key comprises a product identifier.

19. (Currently amended) A computer readable medium storing instructions that, when executed by a computer, cause the computer to perform a method of facilitating invalidation of cached data using a secondary key, wherein the computer-readable medium includes one of a volatile memory, a non-volatile memory, a disk drive, a magnetic tape, a compact disc, a digital versatile disk, and a digital video disk, the method comprising:

at an application configured to produce cacheable data objects, associating with a first data object:

a first primary key configured to uniquely identify the first data object within a collection of computer systems; and

a first secondary key configured to identify multiple data objects having a common attribute;

when the first data object is provided to a cache to be cached, providing said first secondary key, wherein the cache is configured to cache multiple versions of the first data object, and wherein each version is cached with a second primary key and the first secondary key; and

issuing an invalidation message from the application to the cache to invalidate the multiple data objects, wherein the invalidation message includes said first secondary key.

20. (Currently amended) A computer-implemented method of facilitating invalidation of cached data using a secondary key, the method comprising:

receiving at a cache a first data object to be cached, wherein the first data

object is accompanied by:

a first primary key configured to uniquely identify the first data object within a network; and

a first secondary key comprising information common to multiple data objects in the network, including the first data object;

wherein the cache is configured to cache multiple versions of the first data object, and wherein each version is cached with a second primary key and the first secondary key;

maintaining at the cache a mapping between said first secondary key and primary keys of the multiple data objects; and

in response to receipt at the cache of an invalidation message identifying said first secondary key:

identifying the primary keys of the multiple data objects; and

invalidating the multiple data objects.

21. (Original) The method of claim 20, wherein said invalidation message does not specify the primary keys of the multiple data objects.

22. (Original) The method of claim 20, wherein requests received at the cache to serve the first data object include the first primary key but not said first secondary key.

23. (Original) The method of claim 20, wherein said first secondary key comprises a security symbol.

24. (Original) The method of claim 20, wherein said first secondary key comprises a name.

25. (Original) The method of claim 20, wherein said first secondary key comprises a date.

26. (Original) The method of claim 20, wherein said first secondary key comprises address information.

27. (Original) The method of claim 20, wherein said first secondary key comprises a product identifier.

28. (Currently amended) A computer readable medium storing instructions that, when executed by a computer, cause the computer to perform a method of facilitating invalidation of cached data using a secondary key, wherein the computer-readable medium includes one of a volatile memory, a non-volatile memory, a disk drive, a magnetic tape, a compact disc, a digital versatile disk, and a digital video disk, the method comprising:

receiving at a cache a first data object to be cached, wherein the first data object is accompanied by:

a first primary key configured to uniquely identify the first data object within a network; and

a first secondary key comprising information common to multiple data objects in the network, including the first data object;

wherein the cache is configured to cache multiple versions of the first data object, and wherein each version is cached with a second primary key and the first secondary key

maintaining at the cache a mapping between said first secondary key and primary keys of the multiple data objects; and

in response to receipt at the cache of an invalidation message identifying said first secondary key:

identifying the primary keys of the multiple data objects; and

invalidating the multiple data objects.

29. (Currently amended) A system for facilitating invalidation of cached data objects, comprising:

a first cache configured to cache data objects for serving to clients; and

a data source, coupled to the first cache via a network, wherein the data source is configured to:

produce data objects for caching in the cache;

associate with each data object a primary key configured to uniquely identify the data object within the network;

associate with each data object a secondary key, wherein each secondary key is associated with a set of data objects having a common attribute; and

issue to the cache an invalidation message comprising a first secondary key to facilitate the invalidation of a first set of data objects;

wherein:

the first cache is configured to cache multiple versions of a first data object; and

each said version is cached with a different primary key and the same secondary key.

30. (Original) The system of claim 29, wherein a client is configured to receive the primary key of a data object it desires, but not the secondary key.

31 (Canceled).

32. (Original) The system of claim 29, further comprising:

a second cache configured to cache a first data object cached by the first cache, with a different primary key and the same secondary key.